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May 6, 2022

VIA: ELECTRONIC FILING

Mr. Adam J. Teitzman
Commission Clerk
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, FL 32399-0850

Re: Tampa Electric Company's January 2022 to December 2031Ten-Year Site Plan
Undocketed: 20220000-OT

Dear Mr. Teitzman:

Attached for filing on behalf of Tampa Electric Company is the company's response to Supplemental Data Request No. 1 (Nos. 1-95), propounded on March 8, 2022.

Thank you for your assistance in connection with this matter.

Sincerely,

Malcolm N. Means

Malcolm N. Means

MNM/bmp
Attachment
cc: Donald Phillips - DPhillip@psc.state.fl.us
TECO Regulatory – regdept@tecoenergy.com

TAMPA ELECTRIC COMPANY
UNDOCKETED: REVIEW OF TYSP'S
SUPPLEMENTAL DATA REQUEST
REQUEST NO. 1
BATES PAGE: 1
FILED: MAY 6, 2022

General Items

1. Please provide an electronic copy of the Company's Ten-Year Site Plan (TYSP) for the period 2022-2031 (current planning period) in PDF format.

A. An electronic PDF copy of Tampa Electric's 2022 Ten-Year Site Plan was provided to Staff on April 1, 2022.

2. Please provide an electronic copy of all schedules and tables in the Company's current planning period TYSP in Microsoft Excel format.

A. An electronic Excel copy of Tampa Electric's Ten-Year Site Plan schedules and tables was provided to Staff on April 1, 2022.

TAMPA ELECTRIC COMPANY
UNDOCKETED: REVIEW OF TYSP'S
SUPPLEMENTAL DATA REQUEST
REQUEST NO. 3
BATES PAGES: 3-4
FILED: MAY 6, 2022

3. Please refer to the Excel Tables File (Financial Assumptions, Financial Escalation). Complete the tables by providing information on the financial assumptions and financial escalation assumptions used in developing the Company's TYSP. If any of the requested data is already included in the Company's current planning period TYSP, state so on the appropriate form.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tabs Q3_Financial Assumptions and Q3_Financial Escalation.

Load & Demand Forecasting

4. **[Investor-Owned Utilities Only]** Please refer to the Excel Tables File (Hourly System Load). Complete the table by providing, on a system-wide basis, the hourly system load in megawatts (MW) for the period January 1 through December 31 of the year prior to the current planning period. For leap years, please include load values for February 29. Otherwise, leave that row blank.

a. Please also describe how loads are calculated for those hours just prior to and following Daylight Savings Time (March 14, 2021, and November 7, 2021).

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q4_Hourly System Load.

a. Tampa Electric's Forecasting team receives the hourly system load data adjusted for Daylight Savings Time, except the generation. For the Spring Daylight Savings Time (March 14, 2021), there are 23 hours of data, with no data on Hour Ending 24. A zero hour is avoided by taking an average of the previous hour and the following hour to replace the zero on Hour Ending 24. For the Fall Daylight Savings Time (November 7, 2021), there are 25 hours of data. On the double hour, an average of the two hours is taken to replace that hour.

5. Please refer to the Excel Tables File (Historic Peak Demand). Complete the table by providing information on the monthly peak demand experienced during the three-year period prior to the current planning period, including the actual peak demand experienced, the amount of demand response activated during the peak, and the estimated total peak if demand response had not been activated. Please also provide the day, hour, and system-average temperature at the time of each monthly peak.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q5_Historic Peak Demand.

6. Please identify the weather station(s) used for calculation of the system-wide temperature for the Company's service territory. If more than one weather station is utilized, please describe how a system-wide average is calculated.

A. Tampa Electric is presently using National Oceanic and Atmospheric Administration's ("NOAA") Tampa International Airport weather station for calculation of the system-wide temperature of the utility's service territory.

7. Please explain, to the extent not addressed in the Company's current planning period TYSP, how the reported forecasts of the number of customers, demand, and total retail energy sales were developed. In your response, please include the following information:

- Methodology.
- Assumptions.
- Data sources.
- Third-party consultant(s) involved.
- Anticipated forecast accuracy.
- Any difference/improvement(s) made compared with those forecasts used in the Company's most recent prior TYSP.

A. Tampa Electric's customer demand and energy forecast methodology, as well as assumptions and sources, are explained in detail in Chapter II of the 2022 Ten-Year Site Plan ("TYSP") on pages 7 through 20.

Appliance efficiencies are based on data provided by the U.S. Energy Information Administration ("EIA"). The economic assumptions used in the forecast models are derived from Moody's Analytics and the University of Florida's Bureau of Economic and Business Research ("BEBR").

A third-party consultant was not involved in the development of the forecasts reported in the 2022 TYSP.

As for anticipated forecast accuracy, the target is to be within +/- 1 percent.

There were no significant differences or improvements made within the 2022 TYSP compared to the 2021 TYSP.

8. Please identify all closed and open Florida Public Service Commission (FPSC) dockets and all non-docketed FPSC matters which were/are based on the same load forecast used in the Company's current planning period TYSP.

A. 20220001-EI
20220002-EG
20220007-EI
20210063-EQ
20220010-EI
20220048-EI
20220070-EI

TAMPA ELECTRIC COMPANY
UNDOCKETED: REVIEW OF TYSP'S
SUPPLEMENTAL DATA REQUEST
REQUEST NO. 9
BATES PAGES: 10 - 11
FILED: MAY 6, 2022

9. Please explain if your Company evaluates the accuracy of its forecasts of customer growth and annual retail energy sales presented in its past TYSPs by comparing the actual data for a given year to the data forecasted one, two, three, four, five, or six years prior.

a. If your response is affirmative, please explain the method used in your evaluation, and provide the corresponding results, including work papers, in Microsoft Excel format for the analysis of each forecast presented in the TYSPs filed with the Commission during the 20-year period prior to the current planning period. If your Company limits its analysis to a period shorter than 20 years prior to the current planning period, please provide what analysis you have and a narrative explaining why your Company limits its analysis period.

b. If your response is negative, please explain why.

A. Yes, Tampa Electric does review the accuracy of its customer growth and retail energy sales forecasts.

a. The method used to review the accuracy of forecasts throughout time is referred to as an error fan. This approach is also used by the Florida Reliability Coordinating Council ("FRCC") in reviewing state forecast accuracy. Please refer to the provided Excel, "BS 11_Accuracy2022.xlsx".

b. Not applicable.

10. Please explain if your Company evaluates the accuracy of its forecasts of Summer/Winter Peak Energy Demand presented in its past TYSPs by comparing the actual data for a given year to the data forecasted one, two, three, four, five, or six years prior.

a. If your response is affirmative, please explain the method used in your evaluation, and provide the corresponding results, including work papers, in Microsoft Excel format for the analysis of each forecast presented in the TYSPs filed with the Commission during the 20-year period prior to the current planning period. If your Company limits its analysis to a period shorter than 20 years prior to the current planning period, please provide what analysis you have and a narrative explaining why your Company limits its analysis period.

b. If your response is negative, please explain why.

A. Yes, Tampa Electric does review the accuracy of Summer/Winter peak demand forecasts.

a. The method used to review the accuracy of forecasts throughout time is referred to as an error fan. This approach is also used by the FRCC in reviewing state forecast accuracy. Please refer to the provided Excel, "BS 11_Accuracy2022.xlsx".

b. Not applicable.

TAMPA ELECTRIC COMPANY
UNDOCKETED: REVIEW OF TYSP'S
SUPPLEMENTAL DATA REQUEST
REQUEST NO. 11
BATES PAGES: 13 - 15
FILED: MAY 6, 2022

11. Please explain any historic and forecasted trends in each of the following:

a. Growth of customers, by customer type (residential, commercial, industrial) as well as Total Customers, and identify the major factors (historically, currently, and in the forecasted period) that contribute to the growth/decline of the trends.

b. Average KWh consumption per customer, by customer type (residential, commercial, industrial), and identify the major factors (historically, currently, and in the forecasted period) that contribute to the growth/decline of the trends.

c. Total Sales (GWh) to Ultimate Customers, identify the major factors (historically, currently, and in the forecasted period) that contribute to the growth/decline of the trends. Please include a detailed discussion of how the Company's demand management program(s) and conservation/energy-efficiency program(s) impact the growth/decline of the trends.

A. a. **RESIDENTIAL**:
The residential sector's growth averaged 2.1 percent in 2021. Growth in 2022 is expected to be 1.7 percent. Customer growth is expected to increase at an annual average growth rate of 1.4 percent over the Ten Year Site Plan's forecast horizon. The primary driver of customer growth will be new construction and increasing net in-migration to the service area.

COMMERCIAL:
Commercial customer growth averaged 1.7 percent in 2021 and is expected to increase by 1.6 percent in 2022. Customers are expected to increase at an annual average growth rate of 0.4 percent over the forecast horizon.

GOVERNMENTAL:
Governmental customer growth increased by 0.7 percent in 2021 and is expected to increase by 0.9 percent in 2022. Growth is projected to increase at a rate of 0.6 percent over the forecast horizon.

INDUSTRIAL:
Industrial customer growth continued to decline in 2021. The decline is primarily in the smaller manufacturing segment, as well as some migration

to the commercial sector. The number of industrial accounts is anticipated to remain relatively flat over the next ten years.

TOTAL:
Total customer growth in 2021 averaged 2.0 percent with the residential class being the engine behind the growth. Over the forecast horizon, customer growth is expected to increase at an average rate of 1.3 percent annually.

b. **RESIDENTIAL:**
Average consumption per customer decreased in 2021 primarily due to milder weather than in the prior year. In addition, the effects of COVID-19 have lessened. Average consumption per customer is expected to decline at an average annual rate of 0.4 percent over the Ten-Year Site Plan's forecast horizon. The primary drivers behind the declining per customer usage are increases in appliance efficiencies, lighting efficiencies, energy efficiency in new homes, conservation efforts, and housing mix.

COMMERCIAL:
Commercial consumption per customer in 2021 was slightly lower by 0.3 percent than in 2020. It is projected to remain relatively flat over the Ten-Year Site Plan's forecast horizon.

GOVERNMENTAL:
Average per customer usage in 2021 was in line with 2020. Over the forecast horizon, usage is expected to increase by an average of 0.1 percent.

INDUSTRIAL:
Industrial per customer usage in 2021 was higher than 2020 primarily due to the industrial phosphate sector that had less self-serving generation and more energy purchases from Tampa Electric. Over the forecast horizon, average usage is expected to decrease slightly by an average of 0.1 percent.

c. **TOTAL RETAIL NET ENERGY FOR LOAD (RNEL):**
Although customer growth was up in 2021, the milder weather resulted in energy sales that were not significantly different than in 2020. Over the forecast horizon, RNEL is expected to increase by 0.6 percent a year. This is below the customer growth rate of 1.3 percent primarily due to continued per-customer-kWh declines in the Residential sector (see discussion in B. above), as well as declines in the phosphate sector as

mining continues to move south and out of Tampa Electric's service territory.

12. Please explain any historic and forecasted trends in each of the following components of Summer/Winter Peak Demand:

a. Demand Reduction due to Conservation and Self Service, by customer type (residential, commercial, industrial) as well as Total Customers, and identify the major factors (historically, currently, and in the forecasted period) that contribute to the growth/decline in the trends.

b. Demand Reduction due to Demand Response, by customer type (residential, commercial, industrial), and identify the major factors (historically, currently, and in the forecasted period) that contribute to the growth/decline of the trends.

c. Total Demand, and identify the major factors (historically, currently, and in the forecasted period) that contribute to the growth/decline in the trends.

d. Net Firm Demand, by the sources of peak demand appearing in Schedule 3.1 and Schedule 3.2 of the current planning period TYSP, and identify the major factors (historically, currently, and in the forecasted period) that contribute to the growth/decline in the trends.

A. a. **CONSERVATION AND SELF SERVICE:**
Residential conservation at the time of the summer peak has historically increased by an average of 5 MW a year. Over the forecast horizon it is increasing by an average of 13 MW a year. At the time of the winter peak, residential conservation historically increased by an average of 7 MW a year and is projected to increase by an average of 10 MW a year. The primary driver of this growth is the increasing number of participants in Tampa Electric's conservation programs.

Commercial and Industrial conservation at the time of the summer peak has increased by an average of 8 MW a year, and over the forecast horizon it is increasing by an average of 6 MW a year. At the time of the winter peak, it historically increased by an average of 5 MW a year and is projected to increase by 5 MW a year on average.

Self-service is assumed to follow historical trends. If changes in self-service are known, forecasts will be adjusted for up or down.

b. **DEMAND RESPONSE / LOAD MANAGEMENT:**

Since 2015, there have not been any residential load management or demand response programs. Starting in 2022 a new Prime Time Plus program will begin. Summer and Winter will ramp up and stabilize at an average annual increase of 8 MW per year.

Commercial and Industrial load management and demand response at the time of the summer and winter peaks has been relatively flat over the past five years and is projected to remain relatively flat over the forecast horizon. This trend is primarily due to no changes in the number of customers participating in the Standby Generator program and no expected contractual changes in the Demand Response program.

c. **TOTAL DEMAND:**

Summer retail peaks historically increased on average by 56 MW a year and are expected to increase by an average of 34 MW (0.8 percent) a year over the forecast horizon. The slower decline over the forecast horizon is primarily due to the decline in Interruptible Phosphate loads. The 2021 summer peak increased by 129 MW due to hotter than normal weather on the peak day compared to the prior year's peak day.

Historically, winter retail peaks vary significantly due to very mild winters and an occasional cold winter. Winter peaks are expected to increase by an average of 43 MW (0.9 percent) a year over the forecast horizon. The 2021 winter peak was almost 90 MW lower than the prior year's peak due to milder weather. Winter peaks increase at a slightly faster rate due to minimal impacts from rooftop solar at the time of winter peaks.

Customer growth is the primary driver behind the growth in summer and winter total peak demands.

d. **NET FIRM DEMAND:**

Summer firm peaks historically increased on average by 53 MW a year and are expected to increase by an average of 27 MW (0.7 percent) a year over the forecast horizon. The slower decline over the forecast horizon is primarily due to the decline in Interruptible Phosphate loads, which eventually stabilizes over the forecast horizon. The 2021 summer firm peak increased by 55 MW due to the hotter than normal temperatures on the peak day and days prior.

Historically, winter firm peaks vary significantly due to very mild winters and an occasional cold winter. Winter firm peaks are expected to increase by an average of 37 MW (0.8 percent) a year over the forecast horizon.

Customer growth is the primary driver behind the growth in summer and winter firm peak demands.

13. Please explain any anomalies caused by non-weather events with regard to annual historical data points for the period 10 years prior to the current planning period that have contributed to the following, respectively:

a. Summer Peak Demand.

b. Winter Peak Demand.

c. Annual Retail Energy Sales

A. Upon review of the company's summer and winter peak demand for the ten years prior to the current planning period, there have been no anomalies caused by non-weather events.

a. Upon review of the company's summer peak demand for the ten years prior to the current planning period, there have been no anomalies caused by non-weather events.

b. Upon review of the company's winter peak demand for the ten years prior to the current planning period, there have been no anomalies caused by non-weather events.

c. Upon review of the company's annual retail energy sales for the ten years prior to the current planning period, there have been no anomalies caused by non-weather events.

TAMPA ELECTRIC COMPANY
UNDOCKETED: REVIEW OF TYSP'S
SUPPLEMENTAL DATA REQUEST
REQUEST NO. 14
BATES PAGES: 20 - 21
FILED: MAY 6, 2022

14. Please provide responses to the following questions regarding the weather factors considered in the Company's retail energy sales and peak demand forecasts:

a. Please identify, with corresponding explanations, all the weather-related input variables that were used in the respective Retail Energy Sales, Winter Peak Demand, and Summer Peak Demand models.

b. Please specify the source(s) of the weather data used in the aforementioned forecasting models.

c. Please explain in detail the process/procedure/method, if any, the Company utilized to convert the raw weather data into the values of the model input variables.

d. Please specify with corresponding explanations:

e. How many years' historical weather data was used in developing each retail energy sales and peak demand model.

f. How many years' historical weather data was used in the process of these models' calibration and/or validation.

g. Please explain how the projected values of the input weather variables (that were used to forecast the future sales or demand outputs for each planning years 2022 – 2031) were derived/obtained for the respective retail sales and peak demand models.

A. a. The Retail Energy Sales model uses the following weather-related input variables: monthly degree days and monthly normal degree days.

The Peak Demand model uses the following weather-related input variables: peak day 24-hr degree days, lag peak day 24-hr degree days, and degree days at the time of the peak.

b. The source of the weather data Tampa Electric uses is the National Oceanic and Atmospheric Administration (NOAA)'s Tampa International Airport (TIA) weather station for calculation of the system-wide temperature of the utility's service territory.

c. For the Energy Sales models, Tampa Electric converts the daily average NOAA TIA dry bulb temperature into a daily degree day using the 65-degree base to determine if it is a heating degree day (less than 65-degree base) or cooling degree day (greater than 65-degree base).

Calendar degree days are converted to billing cycle degree days by proportioning degree days depending on how many billing cycles (i.e. cycle 1-21, 23) were billed during the billing period.

In the Peak Demand models, dry bulb temperature data is also converted into a daily degree day using the 65-degree base for the peak day and lag peak day variables. For the variable representing the weather at the time of the peak, heating degree days are calculated using a 50-degree base and cooling degree day is calculated using a 80-degree base.

d. N/A

e. The Retail Energy Sales and Peak Demand model typically use 10 years of historical weather data for the estimation period.

f. See response to "e".

g. For the Energy Sales models, the projected values of the Normal degree day variables are determined by using 20 years of historical degree day data and running the Monte Carlo simulation to determine the normal degree days.

For Peak Demand models, the projected values of the Normal Peak Day temperatures are determined using 20 years of history, with the exception of January, which is based on the top 20 coldest peak days over the past 50 years.

15. **[Investor-Owned Utilities Only]** If not included in the Company's current planning period TYSP, please provide load forecast sensitivities (high band, low band) to account for the uncertainty inherent in the base case forecasts in the following TYSP schedules, as well as the methodology used to prepare each forecast:

a. Schedule 2.1 – History and Forecast of Energy Consumption and Number of Customers by Customer Class.

b. Schedule 2.2 - History and Forecast of Energy Consumption and Number of Customers by Customer Class.

c. Schedule 2.3 - History and Forecast of Energy Consumption and Number of Customers by Customer Class.

d. Schedule 3.1 - History and Forecast of Summer Peak Demand.

e. Schedule 3.2 - History and Forecast of Winter Peak Demand.

f. Schedule 3.3 - History and Forecast of Annual Net Energy for Load.

g. Schedule 4 - Previous Year and 2-Year Forecast of Peak Demand and Net Energy for Load by Month.

A. The high and low band sensitivities are included in the current planning period TYSP, within Chapter IV, pages 32 through 55. The methodology used to prepare load forecast sensitivities (high band, low band) for Schedules 2.1, 2.2, 2.3, 3.1, 3.2, 3.3 and 4 is listed with the 2022 TYSP, Chapter II, page 19 under "High and Low Scenario Forecast Assumptions".

16. Please provide responses to the following questions regarding the possible impacts of COVID-19 Pandemic (Pandemic) on the utility load forecast:

a. Please briefly summarize the impacts due to the Pandemic, if any, to the accuracy of the Company's respective forecast of annual retail energy sales and peak demands for 2020 and 2021.

b. Have any of your 2022 TYSP retail energy sales and peak demand forecasts incorporated the potential impacts of the Pandemic? Please explain your response.

A. a. In 2020, the Pandemic had offsetting impacts; Residential energy sales increased while the non-residential energy sales decreased. The net impact of the Pandemic was a decline in energy sales. The second factor impacting accuracy was weather, it was much hotter than normal which offset any Pandemic related declines in energy sales. Actual energy sales were 2.0 percent above the forecast in 2020.

In 2021, the Pandemic's impact on energy sales was minimal as the situation improved steadily during the year. In addition, weather was favorable. Actual energy sales were 1.7 percent above the forecast in 2021.

Pandemic impacts on demand are difficult to determine since weather was the primary driver for forecast variances. In both 2020 and 2021 winters were very mild and summers were hotter than normal. Winter peaks were below budget by 846 and 1001 MW in 2020 and 2021, respectively. Summer peaks were above budget by 116 and 225 MW in 2020 and 2021, respectively.

b. Forecasted energy sales and peak demands do not have any Pandemic impacts incorporated into them. The effects in 2021 were minimal and it is assumed that going forward the impacts will also be minimal.

TAMPA ELECTRIC COMPANY
UNDOCKETED: REVIEW OF TYSP'S
SUPPLEMENTAL DATA REQUEST
REQUEST NO. 17
BATES PAGES: 24 - 25
FILED: MAY 6, 2022

17. Please address the following questions regarding the impact of all customer-owned/leased renewable generation (solar and otherwise) on the Utility's forecasts.

a. Please explain in detail how the Utility's load forecast accounts for the impact of customer owned/leased renewable generation (solar and otherwise).

b. Please provide the annual impact, if any, of customer-owned/leased renewable generation (solar and otherwise) on the Utility's retail demand and energy forecasts, by class and in total, for 2022 through 2031.

c. If the Utility maintains a forecast for the planning horizon (2022-2031) of the number of customers with customer-owned/leased renewable generation (solar and otherwise), by customer class, please provide.

A. a. It is assumed Tampa Electric will no longer have to serve the portion of PV customers' load; therefore, the energy sales and retail peak forecasts are adjusted downward to incorporate the loss of this load. Specifically, the incremental effects of customer-owned/leased renewable generation is subtracted from the retail energy sales forecast and the incremental effects of the projected PV demand at the time of the retail peak is subtracted from the retail peak forecast. Tampa Electric only assumes some PV load is on during the retail summer peak and assumes no load at the time of the retail winter peak.

b. Please refer to the tables below for forecasted generation and demand impacts for the period 2022 through 2031.

c. Please refer to the table below for forecasted counts of customers with customer-owned/leased renewable generation.

TAMPA ELECTRIC COMPANY
UNDOCKETED: REVIEW OF TYSP'S
SUPPLEMENTAL DATA REQUEST
REQUEST NO. 17
BATES PAGES: 24 - 25
FILED: MAY 6, 2022

Customer-Owned/Leased Renewable Generation						
	INCREMENTAL			CUMULATIVE		
	Residential Generation [GWH]	Non-Residential Generation [GWH]	Total Generation [GWH]	Residential Generation [GWH]	Non-Residential Generation [GWH]	Total Generation [GWH]
2022	18.5	2.7	21.2	138.0	34.6	172.6
2023	18.2	1.5	19.7	156.2	36.1	192.3
2024	18.7	0.6	19.4	175.0	36.7	211.7
2025	17.6	1.1	18.7	192.6	37.8	230.4
2026	18.1	0.9	19.0	210.7	38.7	249.4
2027	18.3	1.5	19.8	229.0	40.2	269.2
2028	18.9	1.0	19.9	247.9	41.2	289.1
2029	17.7	1.5	19.3	265.6	42.7	308.4
2030	18.4	0.9	19.4	284.1	43.7	327.8
2031	18.7	0.4	19.1	302.7	44.1	346.9

Customer-Owned/Leased Renewable Installed Demand and Contribution at TEC's Retail Peak								
	INCREMENTAL			CUMULATIVE				
	Residential Installed Demand [MW_{AC}]	Non-Residential Installed Demand [MW_{AC}]	Total Installed Demand [MW_{AC}]	Residential Installed Demand [MW_{AC}]	Non-Residential Installed Demand [MW_{AC}]	Total Installed Demand [MW_{AC}]	Contribution* at Retail Winter Peak Demand [MW_{AC}]	Contribution* at Retail Summer Peak Demand [MW_{AC}]
2022	11.8	1.7	13.5	87.5	22.0	109.5	-	41.6
2023	11.6	0.9	12.5	99.1	22.9	122.0	-	46.3
2024	11.6	0.3	11.9	110.7	23.2	133.9	-	50.9
2025	11.5	0.7	12.2	122.1	24.0	146.1	-	55.5
2026	11.5	0.6	12.1	133.6	24.6	158.2	-	60.1
2027	11.6	0.9	12.5	145.2	25.5	170.7	-	64.9
2028	11.6	0.6	12.1	156.8	26.1	182.8	-	69.5
2029	11.7	1.1	12.7	168.5	27.1	195.6	-	74.3
2030	11.7	0.6	12.3	180.2	27.7	207.9	-	79.0
2031	11.8	0.3	12.1	192.0	28.0	220.0	-	83.6

Number of Customers with Customer-Owned/Leased Renewable Generation						
	INCREMENTAL			CUMULATIVE		
	Residential	Non-Residential	Total	Residential	Non-Residential	Total No. Installations
2022	1,538	19	1,558	11,433	243	11,675
2023	1,514	10	1,525	12,947	253	13,200
2024	1,514	4	1,518	14,461	257	14,718
2025	1,502	8	1,511	15,963	265	16,228
2026	1,501	7	1,507	17,464	272	17,736
2027	1,517	11	1,527	18,981	283	19,263
2028	1,515	6	1,521	20,495	289	20,784
2029	1,529	12	1,541	22,024	301	22,325
2030	1,530	7	1,537	23,554	308	23,862
2031	1,549	3	1,553	25,103	311	25,414

18. Please discuss whether the Company included plug-in electric vehicle (PEV) loads in its demand and energy forecasts for its current planning period TYSP. If so, how were these impacts accounted for in the modeling and forecasting process?

A. Tampa Electric developed estimates of the number of plug-in electric vehicles and their impacts on the demand and energy forecasts. These estimates were incorporated into the forecast results reported in the 2022 TYSP.

The energy sales and retail peak forecasts are adjusted upward to incorporate the gain of this EV charging load. Specifically, the incremental effects of EV charging are added to the retail energy sales forecast and the incremental effects of the projected EV demand at the time of the retail peak are added to the retail peak forecast.

19. Please discuss the methodology and the assumptions (or, if applicable, the source(s) of the data) used to estimate the number of PEVs operating in the Company's service territory and the methodology used to estimate the cumulative impact on system demand and energy consumption.

A. The electric vehicle forecast process begins with an estimate of the number of EVs operating in Tampa Electric's service area using the most recent data provided by an independent third-party analyst. Future penetration levels of EVs are based on assumptions used by the Energy Information Administration's (EIA) for the South Atlantic region. The demand and energy consumption associated with EV charging is based on a number of assumptions including the average number of miles driven in a year, the weighted average battery size of common EV models sold within the service area and the number of charges per year.

20. Please refer to the Excel Tables File (Electric Vehicle Charging). Complete the table by providing estimates of the requested information within the Company's service territory for the current planning period. Direct current fast charger (DCFC) PEV charging stations are those that require a service drop greater than 240 volts and/or use three-phase power.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q20_Electric Vehicle Charging.

TAMPA ELECTRIC COMPANY
UNDOCKETED: REVIEW OF TYSP'S
SUPPLEMENTAL DATA REQUEST
REQUEST NO. 21
BATES PAGES: 29 - 31
FILED: MAY 6, 2022

21. Please describe any Company programs or tariffs currently offered to customers relating to PEVs, and describe whether any new or additional programs or tariffs relating to PEVs will be offered to customers within the current planning period.

a. Of these programs or tariffs, are any designed for or do they include educating customers on electricity as a transportation fuel?

b. Does the Company have any programs where customers can express their interest or expectations for electric vehicle infrastructure as provided for by the Utility, and if so, please describe in detail.

A. Tampa Electric continues to be active on several activities and potential offerings of future programs or tariffs with plug-in electric vehicles.

In May 2017, Tampa Electric received Commission approval to enhance the Energy Education, Awareness and Agency Outreach DSM Program by partnering with high schools' driver's education in the classroom. This portion of the program focuses on providing opportunities to encourage the conservation of energy and promote energy efficiency through local school systems by partnering with high schools' driver's education classes. All three selected high schools began offering the program in the 2019 school year.

In March 2020, Tampa Electric also received Commission approval for a variance to the traditional method for calculating contribution-in-aid-of-construction (CIAC) as described in Rule 25-6.064 Florida Administrative Code and as it applies to new primary line extensions to serve high-voltage EV chargers. As Company revenues from these new stations are likely to be very low until the EV market further matures, a minimal credit against what is often a substantial line extension cost presents a barrier to developing these EV charging sites. During a five-year pilot period, the revenue estimation period is extended from five years to ten years. During the pilot period, Tampa Electric will gather information to determine whether it has a beneficial impact on the EV market and provide annual reporting to the Commission.

In August 2020, the Commission approved Tampa Electric's commercial/industrial Integrated Renewable Energy System (Pilot) Program. The construction of the project was completed in 2021, and in the beginning of 2022 the company started the five-year study phase to evaluate the capabilities and DSM opportunities of a fully integrated renewable energy system. The final system consists of an 862 kW photovoltaic array located on five carports, five

commercial-sized powerpack batteries capable of storing 1,160 kWh of energy, six dual headed level two electric vehicle charging systems, and ten industrial truck battery charging stations. This pilot program has three main purposes: the first is to evaluate the ability to maximize the demand side management benefits from this integrated system, second is to determine the ideal operating parameters that a commercial or industrial customer would operate this type of system, and third, to use the installation and its associated operational information as an education platform for commercial and industrial customers seeking information on this type of system and its benefits, concerns, and capabilities. Tampa Electric included its first update on the lessons learned during the construction of the integrated renewable energy system within the company's 2021 DSM annual report that was field with the Commission on February 14, 2022.

In May 2021, the Commission issued the Final Order granting approval for Tampa Electric's public EV charging pilot program, today called Drive Smart℠. Through this pilot, Tampa Electric is deploying approximately two hundred Level Two (240v) and up to four DC Fast Charger (DCFC) EV charging ports across the company service territory to collect valuable grid-related data that supports proper utility planning. Tampa Electric will contribute up to $5,000 per port towards the cost of equipment and installation, and the participating customer would be responsible for any costs exceeding that contribution. Hardware and installation costs for government and income qualified locations, as well as the DCFC locations, will be fully covered by Tampa Electric. During the four-year pilot, Tampa Electric will own and maintain the charging ports and provide annual reporting to the Commission on all aspects of the pilot program. Tampa Electric will seek future approval from the Commission on recommended action beyond pilot period, whether terminating, extending, or modifying the pilot program. The first Drive Smart charging ports were installed in April 2022.

a. Tampa Electric believes that any involvement the PEV market provides some level of customer education, if only through awareness, on the benefits of electricity as a transportation fuel. The 2017 enhancement to the Energy Education, Awareness and Agency Outreach DSM Program is specifically intended to educate future customers. The 2020 Integrated Renewable Energy System Program includes a major component to help educate commercial and industrial customers interested in the technology, and the Drive Smart EV charging program will help to educate participating site hosts on considerations for providing EV charging at their facilities, including installation and operating costs.

b. Tampa Electric's Drive Smart EV charging pilot program, provides customers an opportunity to express their interest in electric vehicle infrastructure as provided for by the Utility. To be considered for participation, commercial customers have an opportunity to self-nominate for consideration. Tampa Electric utilizes an on-line application process to initially evaluate customer locations, which helps to measure the level of interest from commercial customers. While the application process currently in use is not primarily intended to measure customer interest in such programs, Tampa Electric will be including relative data as part of the annual reporting to the Commission on pilot program activities.

22. Please describe how the Company monitors the installation of PEV public charging stations in its service area.

A. Tampa Electric does not have a specific process capable of monitoring the installation of third-party PEV public charging stations. While relationships with equipment installers and EV charging network operators helps to provide data on existing and planned public charging stations, Tampa Electric also utilizes the Department of Energy's Alternative Fuels Data Center to identify public charging stations. Tampa Electric also leverages relationships with local developers for large projects where public charging may, or could be, included. For "quick-charge" electric vehicle stations requiring greater than 240-volt services, internal collaboration amongst various work teams ensures that new installations are properly identified, as these types of installations usually require Tampa Electric involvement for new utility service.

23. Please describe any instances since January 1 of the year prior to the current planning period in which upgrades to the distribution system were made where PEVs were a contributing factor.

A. Tampa Electric is not aware of any instances since January 1, 2021, in which electric vehicles were a contributing factor to upgrades required on the company's distribution system.

24. Has the Company conducted or contracted any research to determine demographic and regional factors that influence the adoption of PEVs applicable to its service territory? If so, please describe in detail the methodology and findings.

A. Tampa Electric has not conducted or contracted any research to determine demographic and regional factors that influence EV adoption in the company's service territory.

25. What processes or technologies, if any, are in place that allow the Company to be notified when a customer has installed a PEV charging station in their home?

A. Tampa Electric does not have a process or technology in place that allows for company notification when a home EV charging station has been installed.

26. What are the major drivers of the Company's PEV growth?

A. While the company does not have specific data to indicate what the major drivers are for past or forecast EV growth, it is believed that customer adoption of EVs has been influenced by the following:

- Increased customer awareness of EV technology
- Increased vehicle availability (make and model)
- Expansion and visibility of public EV charging infrastructure
- Increased miles per charge reducing range anxiety
- Continued movement towards cost parity between EVs and internal combustion engine models
- Market volatility of liquid fuels consumer pricing

27. Please describe if and how Section 339.287, Florida Statutes, (Electric Vehicle Charging Stations; Infrastructure Plan Development) has impacted the Company's projection of PEV growth and related demand and energy growth.

A. Section 339.287, Florida Statutes, (Electric Vehicle Charging Stations; Infrastructure Plan Development) has not impacted the Company's projection of PEV growth or any related demand and energy growth. Tampa Electric does, however, recognize that funding, federal or otherwise, used by the State to support the plan, particularly for expanding consumer access to EV charging infrastructure, could impact future projections.

28. What has the Company learned about the impact of PEV ownership on the Company's actual and forecasted peak demand?

A. When assessing the impact of PEV ownership on the Company's actual and forecasted peak demand, the company adjusts its retail peak forecasts upward to incorporate the gain of this EV charging load. Specifically, the incremental effects of projected EV charging demand at the time of the retail peak are added to the retail peak forecast.

29. If applicable, please describe any key findings and metrics of the Company's EV pilot program(s) which reveal the PEV impact to the demand and energy requirements of the Company.

A. While Tampa Electric expects EV-related pilot programs, particularly the Drive Smart and the Integrated Renewable Energy Systems pilot programs, to reveal findings regarding PEV impact on demand and energy requirements, both pilots have not reached a level of maturity where such findings are available.

30. [**FEECA Utilities Only**].
Please refer to the Excel Tables File (DR Participation). Complete the table by providing for each source of demand response annual customer participation information for 10 years prior to the current planning period. Please also provide a summary of all sources of demand response using the table.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q30_DR Participation.

31. [**FEECA Utilities Only**]
Please refer to the Excel Tables File (DR Annual Use). Complete the table by providing for each source of demand response annual usage information for 10 years prior to the current planning period. Please also provide a summary of all demand response using the table.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q31_DR Annual Use.

32. [**FEECA Utilities Only**].
Please refer to the Excel Tables File (DR Peak Activation). Complete the table by providing for each source of demand response annual seasonal peak activation information for 10 years prior to the current planning period. Please also provide a summary of all demand response using the table.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q32_DR Peak Activation.

33. Please refer to the Excel Tables File (LOLP). Complete the table by providing the loss of load probability, reserve margin, and expected unserved energy for each year of the planning period.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q33_LOLP.

Generation & Transmission

34. Please refer to the Excel Tables File (Unit Performance). Complete the table by providing information on each utility-owned generating resources' outage factors, availability factors, and average net operating heat rate (if applicable). For historical averages, use the past three years and for projected factors, use an average of the next ten-year period.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q34_Unit Performance.

35. Please refer to the Excel Tables File (Utility Existing Traditional). Complete the table by providing information on each utility-owned traditional generation resource in service as of December 31 of the year prior to the current planning period. For multiple small (<250 kW per installation) distributed resources of the same type and fuel source, please include a single combined entry. For capacity factor, use the net capacity as a basis.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q35_Utility Existing Traditional.

36. Please refer to the Excel Tables File (Utility Planned Traditional). Complete the table by providing information on each utility-owned traditional generation resource planned for in-service within the current planning period. For multiple small (<250 kW per installation) distributed resources of the same type and fuel source, please include a single combined entry. For projected capacity factor, use the net capacity as a basis.

a. For each planned utility-owned traditional generation resource in the table, provide a narrative response discussing the current status of the project.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q36_Utility Planned Traditional.

a. The BB 1 Modernization (BB Mod) has received regulatory approval and passed its final decision point. The Big Bend Unit 1 modernization is already significantly underway, including site certification, permitting, engineering, procurement of major equipment, and construction. The combustion turbines and generators have been placed into commercial operation as of December 2021. In addition, the necessary dismantlement scope of the original BB 1 is complete and past the point of returning unit 1 to operation in its previous configuration. The BB Mod Steam Turbine is nearing the end of construction and combined cycle commissioning is on track for December 2022 commercial operation.

Tampa Electric estimates a final decision point for procuring and constructing a typical reciprocating internal combustion engine (RICE) to be approximately 33 months prior to the expected in-service date. The 33 months is comprised of 18 months for engineering, procurement, and permitting, which could vary depending on the site location, and 15 months for construction. The 33-month time estimate may be improved or extended based upon major equipment availability and site permitting.

37. Please refer to the Excel Tables File (Utility Existing Renewable). Complete the table by providing information on each utility-owned renewable generation resource in service as of December 31 of the year prior to the current planning period. For multiple small (<250 kW per installation) distributed resources of the same type and fuel source, please include a single combined entry. For capacity factor, use the net capacity as a basis.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q37_Utility Existing Renewable.

TAMPA ELECTRIC COMPANY
UNDOCKETED: REVIEW OF TYSP'S
SUPPLEMENTAL DATA REQUEST
REQUEST NO. 38
BATES PAGES: 48 - 49
FILED: MAY 6, 2022

38. Please refer to the Excel Tables File (Utility Planned Renewable). Complete the table by providing information on each utility-owned renewable generation resource planned for in-service within the current planning period. For multiple small (<250 kW per installation) distributed resources of the same type and fuel source, please include a single combined entry. For projected capacity factor, use the net capacity as a basis.

a. For each planned utility-owned renewable resource in the table, provide a narrative response discussing the current status of the project.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q38_Utility Planned Renewable.

a. Construction of Big Bend Floating solar is complete. The project is in service as of March 2022.

Construction of Agrivoltaics solar is almost complete. The project is expected to be in service in May 2022.

Construction of Big Bend II Solar is complete. The project is in service as of January 2022.

Construction of Mountain View solar is complete. The project went into service April 2022.

Construction of Jamison solar is complete. The project went into service April 2022.

Construction of Laurel Oaks solar has begun. The project is expected to be in service by December 2022.

The engineering and design of Riverside solar is underway. Tampa Electric expects to receive permits in May 2022. The project is expected to be in service by December 2022.

The engineering and design of Big Bend II Phase 2 solar is underway. Permit has been received and construction has begun. The project is expected to be in service by December 2022.

The engineering and design of Juniper solar (formerly Palm River Dairy) is underway. Tampa Electric expects permit to be received in June 2022 with

construction to begin thereafter. The project is expected to be in service by December 2022.

The engineering and design of Alafia solar is underway. Tampa Electric expects permits to be received in June 2022 with construction to begin thereafter. The project is expected to be in service by December 2023.

Tampa Electric will begin engineering and design of the Lake Mabel solar (formerly Wheeler) project in August 2022. Permit applications have been submitted and Tampa Electric expects permits to be received by late third quarter 2022 with construction to begin thereafter. The project is expected to be in service by December 2023.

Tampa Electric will begin engineering and design of the Dover solar project in August 2022. Permit applications have been submitted and Tampa Electric expects permits to be received by late third quarter 2022 with construction to begin thereafter. The project is expected to be in service by December 2023.

Tampa Electric has begun preliminary engineering of the Tampa Convention Center rooftop solar project. Construction is expected to begin in the fourth quarter 2022 and the project is expected to be in service by the first quarter of 2023.

39. Please list and discuss any planned utility-owned renewable resources that have, within the past year, been cancelled, delayed, or reduced in scope. What was the primary reason for the changes? What, if any, were the secondary reasons?

A. As utility solar project engineering is developed, the project capacity can change from the preliminary design due to factors that improve scope and factors that decrease scope. These factors are typically environmental in nature or result from improvements in technology from concept to final design.

We have experienced project delays due to the pandemic affecting supply chain, delivery of equipment and materials, and the availability of work force, which contributed to permitting and construction delays.

Tampa Electric will remove the existing 3.4 KW AC PV system at Walker Middle School. The 2004 system has failed and this school is no longer a storm shelter, which was the reason why solar and battery were installed here. Additionally, there is not a teacher supporting a solar curriculum. Tampa Electric will install solar picnic tables at local schools which have a robust STEM curriculum and add additional solar curriculum to enhance the on-site PV and battery structures.

40. Please refer to the Excel Tables File (Firm Purchases). Complete the table by providing information on the Utility's firm capacity and energy purchases.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q40_Firm Purchases.

41. Please refer to the Excel Tables File (PPA Existing Traditional). Complete the table by providing information on each purchased power agreement with a traditional generator still in effect by December 31 of the year prior to the current planning period pursuant to which energy was delivered to the Company during said year.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q41_PPA Existing Traditional.

Tampa Electric had one (1) purchased power agreement still in effect to serve customers as of December 31, 2021, that remained in effect to serve customers during a portion of the current planning period. That purchase is from Duke Energy Florida (DEF). With the exception of January through February 2022, the DEF purchase is a non-firm energy product with a monthly schedule of up to 360 MW. For January through February 2022 only, 250 MW of the contract is firm. Prior to fall 2021, the DEF purchase had a November 2021 end date, but in fall 2021 Tampa Electric extended the transaction through October 2022.

42. Please refer to the Excel Tables File (PPA Planned Traditional). Complete the table by providing information on each purchased power agreement with a traditional generator pursuant to which energy will begin to be delivered to the Company during the current planning period.

a. For each purchased power agreement in the table, provide a narrative response discussing the current status of the project.

A. The requested data is provided in the Excel Tables Spreadsheet, "2022 TYSP Data Request 1 Excel Tables.xls", tab Q42_DR PPA Planned Traditional.

a. As of January 1, 2022, Tampa Electric had two (2) purchased power agreements available to serve customers during the current planning period, one (1) of which was also in effect during 2021 and is mentioned in Response No. 41. The other purchase began during the year 2022 and is a single purchase from the Florida Municipal Power Agency (FMPA). The FMPA purchase was a 50 MW system firm, peaking call option for January through February 2022 only.

43. Please refer to the Excel Tables File (PPA Existing Renewable). Complete the table by providing information on each purchased power agreement with a renewable generator still in effect by December 31 of the year prior to the current planning period pursuant to which energy was delivered to the Company during said year.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q43_PPA Existing Renewable.

Tampa Electric has one (1) purchased power agreement with a renewable generator for the potential delivery of renewable energy to the company in 2021 and during the current planning period. In January 2021, the company entered into an agreement with Lee County regarding energy deliveries to Tampa Electric from the Lee County Resource Recovery Facility, which is an up to 40 MW net waste-to-energy facility located in southwest Florida. The agreement is pursuant to Tampa Electric's retail tariff Rate Schedule COG-1 and is for the delivery of non-firm energy to the company at Lee County's option. The agreement is for one year with an annual renewal cycle, the first cycle being January through December 2021. Presently, the Lee County facility is a qualifying facility (QF) under the FERC Public Utility Regulatory Policies Act of 1978 (PURPA). In lieu of continuing for another year (i.e., January 2022 through December 2022), and at the request of Lee County, the agreement ended March 2022.

44. Please refer to the Excel Tables File (PPA Planned Renewable). Complete the table by providing information on each purchased power agreement with a renewable generator pursuant to which energy will begin to be delivered to the Company during the current planning period.

a. For each purchased power agreement in the table, provide a narrative response discussing the current status of the project.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q44_PPA Planned Renewable.

a. Tampa Electric has one (1) purchased power agreement with a renewable generator for the potential delivery of renewable energy to the company during the current planning period. The agreement is with Lee County and is mentioned in Response No. 43.

45. Please list and discuss any purchased power agreements with a renewable generator that have, within the past year, been cancelled, delayed, or reduced in scope. What was the primary reason for the change? What, if any, were the secondary reasons?

A. Tampa Electric has one (1) purchased power agreement with a renewable generator that will end earlier than expected. That agreement is with Lee County and will end at the request of Lee County, as mentioned in Response No. 43.

46. Please refer to the Excel Tables File (PSA Existing). Complete the table by providing information on each power sale agreement still in effect by December 31 of the year prior to the current planning period pursuant to which energy was delivered from the Company to a third-party during said year.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q46_PSA Existing.

As of December 31, 2021, Tampa Electric had one sale, and it is a sale of non-firm energy to Seminole Electric Cooperative. That is also Tampa Electric's only planned sale for the current planning period.

47. Please refer to the Excel Tables File (PSA Planned). Complete the table by providing information on each power sale agreement pursuant to which energy will begin to be delivered from the Company to a third-party during the current planning period.

a. For each power sale agreement in the table, provide a narrative response discussing the current status of the agreement.

A. The requested data is provided in the Excel Tables Spreadsheet, "2022 TYSP Data Request 1 Excel Tables.xls", tab Q47_PPA Planned.

a. As noted in the response to Request No. 46, the existing non-firm energy to Seminole Electric Cooperative is Tampa Electric's only planned sale for the current planning period. This transaction has been in place since 1991.

48. Please list and discuss any long-term power sale agreements within the past year that were cancelled, expired, or modified.

A. Tampa Electric had no long-term power sale agreements within the past year that were cancelled, expired, or modified.

TAMPA ELECTRIC COMPANY
UNDOCKETED: REVIEW OF TYSP'S
SUPPLEMENTAL DATA REQUEST
REQUEST NO. 49
BATES PAGE: 60
FILED: MAY 6, 2022

49. Please refer to the Excel Tables File (Annual Renewable Generation). Complete the table by providing the actual and projected annual energy output of all renewable resources on the Company's system, by source, for the 11-year period beginning one year prior to the current planning period.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q49_Annual Renewable Generation.

50. [**Investor-Owned Utilities Only]** Please refer to the Excel Tables File (Potential Solar Sites). Complete the table by providing information on all of the Company's plant sites that are potential candidates for utility-scale (>2 MW) solar installations.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q50_Potential Solar Sites.

TAMPA ELECTRIC COMPANY
UNDOCKETED: REVIEW OF TYSP'S
SUPPLEMENTAL DATA REQUEST
REQUEST NO. 51
BATES PAGES: 62 - 64
FILED: MAY 6, 2022

51. Please describe any actions the Company engages in to encourage production of renewable energy within its service territory.

A. As market conditions continue to change and technology improves, renewable alternatives, such as solar, become more attractive to our customers. Between January 2021 and December 2021, with tax incentives and the incentive provided by the FPSC's net metering rule, over 3,590 customers installed solar panels on their homes or businesses, indicating the increasing acceptance of customer owned renewable generation. Through December 2021, more than 11,350 customers installed PV systems on their homes or businesses, accounting for more than 127 MWDC of net metered, distributed solar generation interconnected on Tampa Electric's grid. Tampa Electric customers/contractors continue to experience the streamlined online interconnection application process that was implemented in 2018.

For over fifteen years, Tampa Electric's Renewable Energy Program has offered residential and commercial and industrial customers the opportunity to purchase 200 kWh renewable energy "blocks" for their home or business. The program also allows residential, commercial and industrial customers the opportunity to purchase renewable energy to power a specific event. This program enables a family, business or venue to make a statement about their commitment to the environment and to renewable energy. The funds from this program build small, community-sited PV arrays at highly visible locations. These demonstration arrays are designed to educate students and the public on the benefits of renewable energy.

Through December 2021 Tampa Electric's Renewable Energy Program has 1,146 customers purchasing over 2,100 blocks of renewable energy each month. The company's renewable-generation portfolio is a mix of various technologies and renewable generating sources, including smaller, company-owned photovoltaic (PV) arrays throughout the community and an increasing number of large-scale PV systems that provide ample solar kWh for the Renewable Energy Block Program. The smaller, community-sited PV arrays are installed at the Museum of Science and Industry ("MOSI"), Walker Middle and Middleton High schools, Tampa Electric's Manatee Viewing Center, Tampa's Lowry Park Zoo, the Florida Aquarium, LEGOLAND Florida's Imagination Zone, and at the Florida Conservation and Technology Center ("FCTC"), an environmental and energy education facility located in Apollo Beach, and solar trees that provide solar powered charging stations for small electronics (cell phones, tablets) at MOSI.

The Renewable Energy Program installations are strategically located throughout the community and are designed to educate students and the public on the benefits of renewable energy. Educational signage touts the advantages of solar energy and interactive displays provide hands-on experience to engage visitors' interest in clean, renewable technologies.

In 2021, the Renewable Energy Program, marketed as Sun to Go, installed a battery and solar charging station at a low-income area community farm near downtown Tampa. This striking structure has solar PV integrated with a battery, with several charging ports to provide charging for smaller electronic devices. The installation of several solar PV integrated with a battery, picnic tables at STEM-Schools throughout the company's service area are planned for installation in 2022. Each of these solar topped structures has bench seating and tabletops equipped with charging ports for small electronics and each solar tree has solar energy education signage. In addition, Tampa Electric installed several solar and battery charging picnic tables, a solar "flower" at the company's Manatee Viewing Center and the Florida Conservation & Technology Center which will further the encouragement of renewable energy by offering device charging for visitors.

In 2020, the company also received Commission approval to add renewable energy education to the company's existing Energy Education, Awareness and Agency Outreach Demand Side Management Program. Tampa Electric is partnering with a third-party vendor and will launch new content on the company's website that is focused on providing customers information on renewable energy. This new platform will inform and educate customers with their solar and storage decisions. Additionally, the website will offer digital tools to help customers that includes a solar calculator tool that estimates the solar potential of each individual property, an equipment buyer's guide comprised of a database of installers' profiles with ratings and reviews, and a comparison-shopping marketplace which standardizes quotes from a network of pre-screened installers.

In mid-2019, Tampa Electric launched a 17.5 MWAC Shared Solar Program, called Sun Select, providing another choice for customers unable to install rooftop solar but prefer their energy generated from solar. Residential and small business customers can purchase locally generated solar power to match 25%, 50% or 100% of the electricity they use. Business and commercial customers can purchase solar in increments of 1,000 kWh. Sun Select participants pay a locked-in solar rate for the solar energy they purchase instead of paying the fuel charge for that portion of participants' electricity use. The energy is generated at Lake Hancock Solar, of which 17.5 MWAC was specifically built to support the

new shared solar program, along with 14.3 MWAC built at the Durrance Solar location for a total of 31.8 MWAC.

On January 1, 2021, Tampa Electric completed the construction of 600 MWAC of utility solar at ten new sites, which is enough electricity to power more than 100,000 homes. Now that these projects are complete, Tampa Electric generates 827 watts per customer of solar capacity and over 7 percent of Tampa Electric's generation comes from the sun. The first two project sites went into service in September 2018 with the ability to generate 144.7 MWAC of clean, renewable energy for more than 22,000 homes. An additional 277.8 MWAC went into service at five more project sites that year. Two more 75 MWAC projects were completed in early 2020, and finally a 60 MWAC site was completed on January 1, 2021. The most recent solar additions, totaling more than 600 MWAC, significantly reduce Tampa Electric's carbon dioxide emissions and give customers the benefit of zero fuel-cost solar generation for years to come. These ten sites along with other solar generating facilities constructed at Legoland Florida, Tampa International Airport, Big Bend, and for the Company's shared solar program now total 655 MWAC of solar power.

In 2021, Tampa Electric participated in several community events throughout the year, promoting and informing customers about the company's solar options for customers including the programs described above. Tampa Electric also participated at events leading to Super Bowl LV to engage customers and visitors, this included providing solar energy education, solar program promotion, and sustainability at pop-up education stations.

52. [**Investor-Owned Utilities Only**] Please discuss whether the Company has been approached by renewable energy generators during the year prior to the current planning period regarding constructing new renewable energy resources. If so, please provide the number and a description of the type of renewable generation represented.

A. Tampa Electric was not approached by any renewable energy generators in 2021.

53. Does the Company consider solar PV to contribute to one or both seasonal peaks for reliability purposes? If so, please provide the percentage contribution and explain how the Company developed the value.

A. For the 2022 TYSP, Tampa Electric used 38 percent for summer reserve margin at the fixed PV sites at Legoland and TIA and 56 percent for summer reserve margin at the single axis tracking sites at Big Bend Solar and approved SoBRA sites and 0.0 percent during the winter. For future tracking PV, Tampa Electric estimates 56 percent as firm generating capacity for Tampa Electric's summer reserve margin and 0.0 percent during the winter. These capacity values are calculated using hourly projections from vendor data and will be updated once Tampa Electric has gathered enough historical data.

54. Please identify whether a declining trend in costs of energy storage technologies has been observed by the Company.

A. Yes, multiple industry forecasts show a steady declining cost trend through the planning horizon. However, due to recent global market disruptions, the costs in the short term have been impacted. It is not yet known if these disruptions will alter long term pricing trends.

55. Briefly discuss any progress in the development and commercialization of non-lithium battery storage technology the Company has observed in recent years.

A. Tampa Electric continuously monitors and evaluates developing technologies including various battery storage technologies. While lithium batteries remain the most mature and widely adopted battery technology, other battery technologies such as flow batteries and other forms of long duration energy storage show potential. Their ability to accommodate repeated cycles with minimal degradation is appealing. However, their higher round trip efficiency losses and initial capital installation costs remain a challenge.

56. Briefly discuss any considerations reviewed in determining the optimal positioning of energy storage technology in the Company's system (e.g., Closer to/further from sources of load, generation, or transmission/distribution capabilities).

A. There are a variety of factors that can influence the optimal positioning of an energy storage facility within Tampa Electric's system. The type of energy storage technology being used may impact the viability at certain locations. Placing energy storage closer to the load can improve customer resiliency, effectively shave the peak, and defer or avoid transmission and/or distribution system upgrades. Energy storage systems can also be used to address possible voltage support and frequency regulation issues. Placing energy storage systems at an existing generating facility can provide black start capability. Co-locating energy storage with solar can take advantage of available Investment Tax Credits as long as at least 75% of the charging energy comes from solar. In addition, the availability of land to place energy storage in densely developed areas remains a consideration.

57. Please explain whether ratepayers have expressed interest in energy storage technologies. If so, how have their interests been addressed?

A. In March 2018, Tampa Electric began interconnecting customer-owned battery systems through the Standard Interconnection Agreement for Interconnected Customer-Owned Battery Subsystems of 1 kW or more. As of December 2021, there are 318 residential customers with 3.030 MWAC of storage capacity interconnected with and without customer-owned solar. No commercial or industrial customer have applied for interconnection, as yet.

Account Management continues to have on-going discussions with Key Accounts on storage technology. Many accounts have been asked to be considered if any pilot opportunities arise, that would allow both parties to learn more about the technology.

58. Please refer to the Excel Tables File (Existing Energy Storage). Complete the table by providing information on all energy storage technologies that are currently either part of the Company's system portfolio or are part of a pilot program sponsored by the Company.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q58_Existing Energy Storage.

59. Please refer to the Excel Tables File (Planned Energy Storage). Complete the table by providing information on all energy storage technologies planned for in-service during the current planning period either as part of the Company's system portfolio or as part of a pilot program sponsored by the Company.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q59_Planned Energy Storage.

TAMPA ELECTRIC COMPANY
UNDOCKETED: REVIEW OF TYSP'S
SUPPLEMENTAL DATA REQUEST
REQUEST NO. 60
BATES PAGES: 73 - 77
FILED: MAY 6, 2022

60. Please identify and describe the objectives and methodologies of all energy storage pilot programs currently running or in development with an anticipated launch date within the current planning period. If the Company is not currently participating in or developing energy storage pilot programs, has it considered doing so? If not, please explain.

a. Please discuss any pilot program results, addressing all anticipated benefits, risks, and operational limitations when such energy storage technology is applied on a utility scale (> 2 MW) to provide for either firm or non-firm capacity and energy.

b. Please provide a brief assessment of how these benefits, risks, and operational limitations may change over the current planning period.

c. Please identify and describe any plans to periodically update the Commission on the status of your energy storage pilot programs.

A. Tampa Electric has two conservation initiatives involving energy storage programs. The first is the company's "Integrated Renewable Energy Storage System (Pilot)" program and the second is the company's "Small to mid-size Commercial Battery Storage conservation research and development ("CRD") initiative.

INTEGRATED RENEWABLE ENERGY STORAGE SYSTEM (PILOT):
This program was approved by the Commission as part of the company's 2020-2029 DSM Plan. This program was initially looked at as a DSM Conservation Research and Development ("CRD") project that started in 2017.

In 2017, Tampa Electric partnered with USF's Center for Urban Transportation Research ("CUTR") to study the potential benefits that electric vehicles could provide to a DSM Program. The partnership developed two studies. The first study was the electric vehicle energy education study which has been fully implemented into three high schools in Hillsborough County. The second study was to perform in-depth research on the benefits that Tampa Electric could potentially realize if the company offered a DSM Program related to electric vehicles. As the performance of this report was being conducted, Tampa Electric began exploring the operational capabilities and characteristics of large commercial electric vehicle lithium-ion batteries and their potential capability to export power to the company's electrical grid during peak

times. The company explored developing a separate R&D project that would involve installing truck batteries (either a three (3) kW or 10 kW sized battery) within three of the company's line trucks to evaluate the potential energy consumed by the charging stations and the amount of demand that can be exported to the grid. In addition, the ability to control the level of discharge to a specified point will also be evaluated to understand the operational impacts of performing these exports during the summer and winter peak season hours. Other items the project would analyze will include the following:

- Economics and cost-effectiveness
- Customer site integration
- Integration of multiple trucks

Because of the costs for batteries seen in the other small to mid-size Commercial Battery Storage project, Tampa Electric made the decision that this R&D project would be placed on hold until additional funding was available, or the battery and associated costs decreased to an acceptable level. In early 2019, the company decided that this CRD project would provide additional benefits if it were included as part of the Integrated Renewable Energy System (Pilot) Program proposed in the company's 2020-2029 DSM Plan.

As part of Tampa Electric's 2020-2029 DSM Plan, Tampa Electric proposed the Integrated Renewable Energy System (Pilot) program to study and understand the potential opportunities and interactions of a fully integrated renewable energy system that contains a photovoltaic system, batteries, car charging and industrial truck charging. The pilot program was designed to be a very cost-effective way to gain the knowledge regarding load shifting during current peak times, load shifting during changing peak times due to high solar penetration, and how to maximize the DSM benefits of these integrated systems (Solar Photovoltaic ("PV") Array, Large Electric Vehicle Charging, Electric Vehicle Charging, Battery Storage). Another important part of the pilot was to make the technology available for viewing and education by potential commercial/industrial customers that are interested in these systems. The Integrated Renewable Energy System was designed to include the following components:

1. 800 kW (AC) solar PV array
2. 290 kW / 1,160 kWh battery energy storage system
3. 10 large electric vehicle access plugs for charging
4. Six (6) dual headed passenger vehicle charging stations

In 2021, the company completed construction of the system and at the time of this filing the system is going through the final processes of commissioning. The integrated renewable energy system was constructed at Tampa Electric's Eastern Service Area and consists of 862 kW photovoltaic system located on five carports, five commercial-sized powerpack batteries capable of storing 1,160 kWh of energy, six dual headed level "2" electric vehicle charging systems, and 10 industrial truck battery charging stations. Tampa Electric provided an update on the lessons learned during construction of this integrated renewable energy systems within the company's annual 2021 DSM Report that was filed with the Commission on February 15, 2022. These lessons learned will be used to assist commercial and industrial customers seeking information on this type of system and its benefits, concerns, and capabilities. Tampa Electric will continue to provide updates in the company's annual DSM reports on the ongoing results of the performance of the system and lessons learned.

SMALL TO MID-SIZE COMMERCIAL BATTERY STORAGE:
In 2021, this CRD project was still in a waiting status due to the COVID-19 pandemic, which prevented the company from initiating the second phase of the original R&D Project plan. This second phase is the identification of one or two commercial facilities for a potential battery installation, which requires site visits and face-to-face interactions with customers.

In the last quarter of 2016, Tampa Electric partnered with the University of South Florida ("USF") College of Engineering to assist in the performance of this CRD project to evaluate the feasibility of potentially offering a battery storage DSM program for commercial/industrial customers. This CRD project will evaluate these small to mid-size commercial battery storage installations through research and field study with at least one battery being installed at a commercial/industrial customer's facility. Tampa Electric specified the size of battery for this CRD project to be between 10 kW and 150 kW with the project from inception to completion lasting approximately three-years. The original timeline was to afford enough time to study these batteries and potentially justify a DSM program within the company's 2020-2029 DSM Plan if the results were positive. The original R&D project was projected to cost approximately $250,000 to achieve the following objectives:

- Evaluate the potential for battery storage for the use of load shifting on demand savings.

- Evaluate the efficiency of load shifting from a battery storage system and the associated control and monitoring system.
- Evaluate the impact on the total energy consumption of the battery and facility when used in a load shifting capacity (versus reliability).
- Evaluate and compare batteries based on performance and cycling tolerance when used in Florida's climate.
- Examine the associated costs from cradle to disposition of battery.
- Evaluate the load profile impact on power vs. capacity tradeoffs.

To achieve these objectives, the small to mid-size Commercial Battery Storage project was broken down into the following four main phases:

1. Battery selection
2. Identify commercial facilities
3. Battery vendor selection
4. Installation of storage system

Phase 1 was completed by USF in 2017. Tampa Electric included a copy of the battery research study in the company's annual DSM report that was filed with the Commission on March 1, 2018. In 2017, after completion of the initial portion of the CRD project, the company sought product availability and costs and found that the prices were greater than the allocation of funds allowed as an R&D program and placed the pursuit of this CRD project on hold until the prices of the batteries dropped to an acceptable level. The company's Commercial Energy Management Team ("CEMT") has continued to keep a pulse on the market and monitors the prices of the batteries to continue the CRD project. In addition to monitoring the prices of the batteries to continue the CRD project, Tampa Electric also filed for an increase in the allowable funds to be used for CRD in the company's most recently filed and Commission approved 2020-2029 DSM Plan. In the 2020-2029 DSM Plan, the program costs were increased on an annual basis from $200,000 per year to $400,000 per year and increased the five-year period total allowable costs from $1,000,000 to $2,000,000.

Tampa Electric has had preliminary facilities identified for follow-up in 2022 with customers that may be interested in participating in this CRD project. The two preliminary facilities include a 911-call center and a low-income community center. The company is hopeful that the costs of

commercial batteries have fallen enough to allow this CRD project to move forward in 2022.

61. If the Company utilizes non-firm generation sources in its system portfolio, please detail whether it currently utilizes or has considered utilizing energy storage technologies to provide firm capacity from such generation sources. If not, please explain.

a. Based on the Company's operational experience, please discuss to what extent energy storage technologies can be used to provide firm capacity from non-firm generation sources. As part of your response, please discuss any operational challenges faced and potential solutions to these challenges.

A. a. While intermittent during the day, solar could be coupled with energy storage to provide a capacity benefit to serve system peak early the next morning or later in the day when the solar is not generating at its maximum output. Thus, battery storage offers the opportunity to complement solar generation. This is one of the key benefits of the Big Bend Energy Storage facility at the Big Bend Solar site.

62. Please identify and describe any programs the Company offers that allows its customers to contribute towards the funding of specific renewable projects, such as community solar programs.

a. Please describe any such programs in development with an anticipated launch date within the current planning period.

A. For 15 years, Tampa Electric has offered a Renewable Energy Program option to customers. Customers can purchase blocks of renewable energy produced at or purchased from clean, renewable energy sources. This tariffed program, dubbed Sun to Go, incudes an additional bill cost of $5.00 per 200 kWh block purchased. The money collected under this program, in major part, goes toward the development and installation of new photovoltaic resources at public places including schools, which serves to both increase solar generation with the Tampa Electric system and educate the public and students on the benefits and operations of solar power generation and battery storage technology.

Tampa Electric's Shared Solar Program, known as Sun Select, was approved and offered to our residential, commercial and industrial customers in late 2019. The Company installed 31.8 MW of solar specifically for program participants.

a. There are no additional programs in development at this time.

63. Please identify and discuss the Company's role in the research and development of utility power technologies. As part of this response, please describe any plans to implement the results of research and development into the Company's system portfolio and discuss how any anticipated benefits will affect your customers.

A. Tampa Electric does not currently have any dedicated R&D programs. Outside of the Conservation R&D program, the company does not actively pursue R&D projects.

64. [**Investor-Owned Utilities Only**]
Please refer to the Excel Tables File (As-Available Energy Rate). Complete the table by providing, on a system-wide basis, the historical annual average as-available energy rate in the Company's service territory for the 10-year period prior to the current planning period. Also, provide the projected annual average as-available energy rate in the Company's service territory for the current planning period. If the Company uses multiple areas for as-available energy rates, please provide a system-average rate as well.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q64_ As-Available Energy Rate.

65. Please refer to the Excel Tables File (Planned PPSA Units). Complete the table by providing information on all planned traditional units with an in-service date within the current planning period. For each planned unit, provide the date of the Commission's Determination of Need and Power Plant Siting Act certification, if applicable.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q65_ Planned PPSA Units.

TAMPA ELECTRIC COMPANY
UNDOCKETED: REVIEW OF TYSP'S
SUPPLEMENTAL DATA REQUEST
REQUEST NO. 66
BATES PAGES: 83 - 84
FILED: MAY 6, 2022

66. For each of the planned generating units, both traditional and renewable, contained in the Company's current planning period TYSP, please discuss the "drop dead" date for a decision on whether or not to construct each unit. Provide a timeline for the construction of each unit, including regulatory approval, and final decision point.

A. The Company has already procured major pieces of equipment for the 600 MWAC of solar being installed through 2023 as identified in Tampa Electric's Ten-Year Site Plan and several of the sites are already under construction. These utility-scale solar projects received regulatory approval for cost recovery in the 2021 rate case. There are multiple projects planned, each less than 75 MW in capacity. The construction of projects totaling 235.1, 200.6, and 159.5 MW began construction in 2020 and will continue through 2023. The remaining projects are expected to be in service in December 2022 and December 2023, respectively. These projects do not require Power Plant Siting Act or Need Determination approvals.

As a result of the present material shortages, transportation delays and increased product lead times, Tampa Electric estimates a final decision point for procuring and constructing a typical solar facility to be approximately 18 months prior to the expected in-service date. The 18 months is comprised of 15 months for engineering, procurement, and permitting, which could vary depending on the site location, and 9 months for construction. The 18-month time estimate may be improved or extended based upon major equipment availability and site permitting.

Future solar projects that are identified in Tampa Electric Company's 2022 Ten-Year Site Plan have already procured or will be procuring (in 2022) major pieces of equipment, including solar modules, inverters and tracker components. The procurement of equipment in 2022 will allow the projects to safe harbor the 26% Investment Tax Credit (ITC) to reduce the cost to our customers. The planned solar projects began construction and/or development in 2020 to provide enough time to ensure safety, sufficient work force and account for schedule disruptions due to weather.

The BB 1 Modernization (BB Mod) has received regulatory approval and passed its final decision point. The Big Bend Unit 1 modernization is already significantly underway, including site certification, permitting, engineering, procurement of major equipment, and construction. The combustion turbines and generators have been placed into commercial operation as of December 2021. In addition, the necessary dismantlement scope of the original BB 1 is complete and past the

point of returning unit 1 to operation in its previous configuration. The BB Mod Steam Turbine is nearing the end of construction and combined cycle commissioning is on track for December 2022 commercial operation.

Tampa Electric estimates a final decision point for procuring and constructing a typical reciprocating internal combustion engine (RICE) to be approximately 33 months prior to the expected in-service date. The 33 months is comprised of 18 months for engineering, procurement, and permitting, which could vary depending on the site location, and 15 months for construction. The 33-month time estimate may be improved or extended based upon major equipment availability and site permitting.

Considering present material shortages, transportation delays, and increased product lead times, Tampa Electric estimates a final decision point for procuring and constructing a typical battery energy storage system (BESS) to be approximately 18 months prior to the expected in-service date. The 18 months is comprised of 15 months for engineering, procurement, and permitting, which could vary depending on the site location, and 9 months for construction. The 18-month time estimate may be improved or extended based upon major equipment availability and site permitting.

Tampa Electric estimates a final decision point for procuring and constructing a typical solar facility to be approximately 15 months prior to the expected in-service date. The 15 months is comprised of 12 months for engineering, procurement, and permitting, which could vary depending on the site location, and 9 months for construction. The 15-month time estimate may be improved or extended based upon major equipment availability and site permitting.

Future solar projects that are identified in Tampa Electric Company's 2022 Ten-Year Site Plan have already procured or will be procuring (in 2021) major pieces of equipment, including solar modules, inverters and tracker components. The procurement of equipment in 2021 will allow the projects to safe harbor the 26% Investment Tax Credit (ITC) to reduce the cost to our customers. The planned solar projects began construction and/or development in 2020 to provide enough time to ensure safety, sufficient work force and account for schedule disruptions due to weather.

67. Please refer to the Excel Tables File (Capacity Factors). Complete the table by providing the actual and projected capacity factors for each existing and planned unit on the Company's system for the 11-year period beginning one year prior to the current planning period.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q67_ Capacity Factors.

68. [**Investor-Owned Utilities Only**] For each existing unit on the Company's system, please provide the planned retirement date. If the Company does not have a planned retirement date for a unit, please provide an estimated lifespan for units of that type and a non-binding estimate of the retirement date for the unit.

A. Refer to the 2022 Ten Year Site Plan, Chapter 1 Schedule 1. Currently the company is depreciating its existing units in accordance with the remaining depreciable life approved in its most recent depreciation study.

69. Please refer to the Excel Tables File (Steam Unit CC Conversion). Complete the table by providing information on all of the Company's steam units that are potential candidates for repowering to operation as Combined Cycle units.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q69_Steam Unit CC Conversion.

70. Please refer to the Excel Tables File (Steam Unit Fuel Switching). Complete the table by providing information on all of the Company's steam units that are potential candidates for fuel-switching.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q70_Steam Unit Fuel Switching.

TAMPA ELECTRIC COMPANY
UNDOCKETED: REVIEW OF TYSP'S
SUPPLEMENTAL DATA REQUEST
REQUEST NO. 71
BATES PAGE: 89
FILED: MAY 6, 2022

71. Please refer to the Excel Tables File (Transmission Lines). Complete the table by providing a list of all proposed transmission lines for the current planning period that require certification under the Transmission Line Siting Act. Please also include in the table transmission lines that have already been approved, but are not yet in-service.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q71_Transmission Lines.

Tampa Electric does not currently have any transmission lines scheduled to be in-service for the current planning period that require certification under the Transmission Line Siting Act. The excel spreadsheet identifies the transmission lines that have already been approved, but are not yet in-service.

Environmental

72. Please explain if the Company assumes carbon dioxide (CO2) compliance costs in the resource planning process used to generate the resource plan presented in the Company's current planning period TYSP. If the response is affirmative, answer the following questions:

a. Please identify the year during the current planning period in which CO2 compliance costs are first assumed to have a non-zero value.

b. **[Investor-Owned Utilities Only]** Please explain if the exclusion of CO2 compliance costs would result in a different resource plan than that presented in the Company's current planning period TYSP.

c. [Investor-Owned Utilities Only] Please provide a revised resource plan assuming no CO2 compliance costs.

A. a. Tampa Electric Company does not include CO2 compliance costs in the resource planning process.

b. Not Applicable.

c. Not Applicable.

TAMPA ELECTRIC COMPANY
UNDOCKETED: REVIEW OF TYSP'S
SUPPLEMENTAL DATA REQUEST
REQUEST NO. 73
BATES PAGES: 91 - 93
FILED: MAY 6, 2022

73. Provide a narrative explaining the impact of any existing environmental regulations relating to air emissions and water quality or waste issues on the Company's system during the previous year. As part of your narrative, please discuss the potential for existing environmental regulations to impact unit dispatch, curtailments, or retirements during the current planning period.

A. AIR EMISSIONS:

In 2021, Tampa Electric (TEC) did not experience significant impacts from environmental regulations relating to air emissions and does not anticipate any significant impacts during the current planning period. Due to grid connectivity, it is possible that air related environmental regulations may impact the operational characteristics of neighboring generating resources to the point of impacting the reliability of the company's system.

In 2017, EPA implemented an update to CSAPR that removed Florida from the CSAPR program based on updated modeling and emission reduction commitments. In December 2019, EPA proposed to approve Florida's Infrastructure State Implementation Plan (SIP) related to the 2015 ozone NAAQS, and on March 5, 2020, the Florida Department of Environmental Protection (FDEP) announced that Florida meets all of the National Ambient Air Quality Standards (NAAQS) statewide.

Tampa Electric is uniquely positioned to be able to meet the Mercury and Air Toxics Standards (MATS) without considerable impacts. All of Tampa Electric's conventional coal-fired units are already equipped with electrostatic precipitators, scrubbers and SCRs, and the Polk Unit 1 IGCC unit emissions are minimized in the gasification process. As a result, Tampa Electric has demonstrated compliance on all applicable units with the most stringent "Low Emitting Electric Generating Unit" classification for MATS with nominal additional capital investment, minimizing the impact of this rule.

In June 2019, the Environmental Protection Agency (EPA) issued the Affordable Clean Energy (ACE) rule, which established guidelines for states to develop greenhouse gas reduction standards for existing coal-fired electric utility generating units (EGUs) through the implementation of heat rate improvement as the best system of emissions reductions. In January 2021, the ACE rule was vacated, clearing the way for the new EPA Administration to issue a replacement rule regulating CO2 emissions from existing power plants. The outcome of the rule-making process and its impact on TEC's businesses is uncertain at this time; however, it could result in increased operating costs, and/or decreased

operations at Tampa Electric's fossil fuel plants which may have an impact on dispatch and retirement schedules. EPA's proposed replacement rule is anticipated in July 2022.

On March 9, 2022, the EPA published a final rule to amend the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Stationary Combustion that removed the stay for natural gas-fired, stationary combustion turbines (CT) and established emission limitations for stationary CTs located at major sources of HAP emissions. Tampa Electric's Big Bend Station will be subject to the Rule and CT Units 4A, 4B, 5, and 6 must demonstrate compliance with the formaldehyde standard by September 5, 2022.

WATER QUALITY:

Tampa Electric discharges cooling water and low volume industrial wastewater at Big Bend, Bayside and Polk Power Stations. These discharges are required to meet water quality effluent limits for both chemical and thermal components. For chemical constituents at all three stations, Tampa Electric implements a combination of control measures, including internal treatment technologies, waste-stream discharge restrictions and recycling of internal waste-streams. At Big Bend Power Station, the only low volume wastewater discharge is the blowdown from the FGD System. All other internal waste-streams are recycled continuously in a zero liquid discharge system which provides makeup water for plant processes. For compliance with thermal permit limitations at Big Bend and Bayside Power Stations, both of which employ once-through cooling technology, the only method of discharge control available is limiting unit output (derating) to reduce thermal loading. Ambient temperature conditions requiring such measures typically occur only in the hottest months (July-September) of the year. Polk Power Station employs a recirculating Cooling Reservoir for thermal control.

WASTE:

The Company continued to comply with the operating requirements of the federal CCR Rule throughout the year. Additionally, two CCR closure projects were completed in 2021. The West Slag Disposal Pond (WSDP) closure project was completed in January 2021 and the Economizer Ash and Pyrites Pond System (EAPPS) Closure Project was completed in October 2021. The only ongoing CCR Rule related project is the North Gypsum Stackout Area (NGSA) Drainage Enhancements, for which expenses will be incurred in 2022 and 2023. None the above projects nor compliance with the CCR or any other waste regulations affected dispatch, curtailments or retirements during the past year. Likewise, compliance with these rules is not expected to affect unit operations during the planning period. Likewise, continued compliance with these rules is not expected to affect unit operations during the planning period.

74. For the U.S. EPA's Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units Rule:

a. Will your Company be materially affected by the rule?

b. What compliance strategy does the Company anticipate employing for the rule?

c. If the strategy has not been completed, what is the Company's timeline for completing the compliance strategy?

d. Will there be any regulatory approvals needed for implementing this compliance strategy? How will this affect the timeline?

e. Does the Company anticipate asking for cost recovery for any expenses related to this rule? Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet by providing information on the costs for the current planning period.

f. If the answer to any of the above questions is not available, please explain why.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q74_Emissions Cost.

a. Yes.

b. The Big Bend Unit 1 modernization project will involve the repowering of Unit 1 with a highly efficient, state of the art, natural gas-fired, combined cycle generating unit. The new units will be designed to comply with the referenced standards.

c. The new units are planned to be in commercial operation in 2022.

d. All regulatory approvals have been received.

e. Tampa Electric does not anticipate asking for cost recovery for any expenses relating to this rule.

f. Not applicable.

75. Explain any expected reliability impacts resulting from each of the EPA rules listed below. As part of your explanation, please discuss the impacts of transmission constraints and changes to units not modified by the rule that may be required to maintain reliability.

a. Mercury and Air Toxics Standards (MATS) Rule.

b. Cross-State Air Pollution Rule (CSAPR).

c. Cooling Water Intake Structures (CWIS) Rule.

d. Coal Combustion Residuals (CCR) Rule.

e. Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units.

f. Affordable Clean Energy Rule.

g. Effluent Limitations Guidelines and Standards (ELGS) from the Steam Electric Power Generating Point Source Category.

A. a. None.

b. None.

c. Effects on reliability related to compliance with this rule will depend on the compliance option implemented at each facility. If, for example, unit operation is contingent on the function of intake structure modifications, then malfunction of screens or pumps could limit or prevent operation of associated generating units.

d. None.

e. None.

f. None.

g. None.

76. Please refer to the Excel Tables File (EPA Operational Effects). Complete the table by identifying, for each unit affected by one or more of EPA's rules, what the impact is for each rule, including; unit retirement, curtailment, installation of additional emissions controls, fuel switching, or other impacts identified by the Company.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q76_EPA Operational Effects.

77. Please refer to the Excel Tables File (EPA Cost Effects). Complete the table by identifying, for each unit impacted by one or more of the EPA's rules, what the estimated cost is for implementing each rule over the course of the planning period.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q77_EPA Cost Effects.

78. Please refer to the Excel Tables File (EPA Unit Availability). Complete the table by identifying, for each unit impacted by one or more of EPA's rules, when and for what duration units would be required to be offline due to retirements, curtailments, installation of additional controls, or additional maintenance related to emission controls. Include important dates relating to each rule.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q78_EPA Unit Availability.

79. If applicable, identify any currently approved costs for environmental compliance investments made by your Company, including but not limited to renewable energy or energy efficiency measures, which would mitigate the need for future investments to comply with recently finalized or proposed EPA regulations. Briefly describe the nature of these investments and identify which rule(s) they are intended to address.

A. As described in the Waste section of Response 73 above, two approved ECRC projects were completed in 2021 to meet the requirements of EPA's CCR Rule. Going forward, Phase II of the approved NGSA Drainage Enhancements Project will be initiated in 2022 and completed not later than 2023. (Note: Phase I was completed in 2020.) Although there will be ongoing annual O&M expenses to maintain compliance with the operating requirements of the CCR Rule (Refer to Excel Tables – EPA Costs tab), the capital investments in the above projects will mitigate the need for future capital investments to meet the rule's requirements.

Fuel Supply & Transportation

80. Please refer to the Excel Tables File (Fuel Usage & Price). Complete the table by providing, on a system-wide basis, the actual annual fuel usage (in GWh) and average fuel price (in nominal $/MMBTU) for each fuel type utilized by the Company in the 10-year period prior to the current planning period. Also, provide the forecasted annual fuel usage (in GWh) and forecasted annual average fuel price (in nominal $/MMBTU) for each fuel type forecasted to be used by the Company in the current planning period.

A. The requested data is provided in the Excel Tables Spreadsheet, "BS 4_2022 TYSP - Data Request 1 Excel Tables.xls", tab Q80_Fuel Usage & Price.

TAMPA ELECTRIC COMPANY
UNDOCKETED: REVIEW OF TYSP'S
SUPPLEMENTAL DATA REQUEST
REQUEST NO. 81
BATES PAGE: 101
FILED: MAY 6, 2022

81. Please discuss how the Company compares its fuel price forecasts to recognized, authoritative independent forecasts.

A. Fuel commodity price forecasting is derived through analysis of historical and current prices combined with price forecasts obtained from various consultants and agencies. These sources include the New York Mercantile Exchange (NYMEX), Energy Information Administration (EIA), S&P Scenario Planning Service Annual Guidebook (originally produced by PIRA Energy Group), S&P Global Market Intelligence, IHS Markit, Argus Coal Daily and Platt's Oilgram. The Company carefully examines its final fuel forecasts for trending relationships among fuels and anomalies (e.g., an unexplainable spike in natural gas prices) to eliminate elements that could impact the validity of long-term energy pricing and planning. The resulting fuel price forecasts, including high and low internal fuel forecasts, are compared to independent sources such as NYMEX, EIA and the S&P Scenario Planning Service Annual Guidebook for reasonableness.

TAMPA ELECTRIC COMPANY
UNDOCKETED: REVIEW OF TYSP'S
SUPPLEMENTAL DATA REQUEST
REQUEST NO. 82
BATES PAGES: 102 - 104
FILED: MAY 6, 2022

82. Please identify and discuss expected industry trends and factors for each fuel type listed below that may affect the Company during the current planning period.

a. Coal

b. Natural Gas

c. Nuclear

d. Fuel Oil

e. Other (please specify each, if any)

A. a. **COAL:**
Although the coal industry has experienced reduced domestic demand over the last few years as coal unit retirements continue and energy production shifts to more renewable generation, coal demand turned around quickly last fall as natural gas prices nearly doubled from earlier in the year, resulting in coal becoming the economic choice for power generation as most of it was under contract at relatively low prices. The demand caused spot coal prices to soar, but even with the increase in coal prices, domestic supply was mostly unavailable as plant capacity had ramped down over the previous years and any excess supply was being exported to meet global demand at record high prices.

While demand for coal was increasing, the rail industry was challenged with post COVID-19 economic recovery labor issues that have been felt in most industries. Fewer trains and congestion from mines to power plants resulted in uncertain or interrupted coal deliveries by rail throughout the country. This ultimately resulted in most power stations operating on reduced coal inventories.

The invasion of Ukraine is bringing more uncertainty into the coal industry as European demand for coal has increased prices again to levels not seen in 20 years or in some cases the highest prices ever. As the Ukraine conflict unfolds and Europe's generation mix quickly evolves as they reduce their dependence on energy from Russia, there is much near- and mid-term uncertainty with coal demand that could impact the planning period from 2022 to 2031. Tampa Electric's reduced coal needs could be impacted by short-term price volatility, uncertain demand from the Ukraine conflict, contracting challenges, rail transportation interruptions and the

need to maintain higher coal inventory to mitigate supply chain disruptions. Tampa Electric's coal consumption as a percentage of system fuel mix is expected to be minimal over the current planning period.

b. **NATURAL GAS:**

Demand for natural gas has been strong during the post COVID-19 economic recovery. Heading into last winter, inventory and production concerns boosted prices and volatility that continue today. Several fundamental factors are influencing supply and demand currently and should continue into the near and mid-term of the planning period. On the demand side, U.S. Liquified Natural Gas (LNG) export facilities continue to operate at maximum capacity consuming up to 13,000,000 MMBtu of feed gas per day with several new projects and capacity additions expected by 2030. Tremendous European and Asian demand for LNG should continue the strong trend of exports. U.S. natural gas exports to Mexico will likely continue as well. Finally, the lack of spot coal availability will drive gas demand in the short term but could also continue into the mid-term. Natural gas production, although expected to steadily grow over the planning period, is currently experiencing much uncertainty because producers are exercising capital discipline rather than increasing production as prices become favorable. This new trend of not increasing production during times of high gas prices is driven by investors and is impacting both shale gas and associated gas from shale oil drilling.

Although we do expect the transition to more renewable generation to keep prices lower throughout the planning period, the invasion of Ukraine is bringing much uncertainty and volatility into the planning period especially in the near term, but also could have long lasting impacts in the energy industry. As Europe and the rest of the world enforce sanctions against Russia and move to become less dependent on Russian energy, worldwide energy supplies are experiencing a sourcing shift which is still unfolding. European demand for LNG will keep existing and planned facilities at full utilization and could spur a new wave of U.S. LNG projects. As the demand from U.S. LNG exports continues to grow, the relationship between domestic and international gas pricing could become more correlated over the planning period.

Extreme weather events such as Storm Uri can also drive short-term price volatility and we acknowledge that uncertain weather events may occur during the planning period. Tampa Electric is continually evaluating and enhancing its portfolio of natural gas assets and supply arrangements to

reliably meet the increasing percentage of fuel mix supplied by natural gas over the current planning period.

c. **NUCLEAR FUEL:**
Tampa Electric does not have nuclear generation facilities.

d. **OIL:**
Oil experienced a strong post COVID-19 recovery over the last year and is now dealing with much uncertainty from the Ukraine invasion. As Europe, the U.S and most of the world quickly shifts away from buying Russian oil supplies to reduce their dependence on Russian energy, the price of oil has experienced significant volatility at elevated prices, and this is expected to continue for the near term. With oil sourcing changing worldwide, the U.S tapping the Strategic Petroleum Reserves, U.S shale oil producers hesitant to increase investment, China dealing with a COVID outbreak and the lack of an OPEC response to the Ukraine event, oil demand and supply is expected to be very uncertain with price volatility continuing in the near to mid-term of the planning period. Other supply and demand drivers are electric vehicle penetration, petrochemical growth, and other behavioral changes from the pandemic. Since Tampa Electric has a small quantity of oil-capable units and uses oil solely as a back-up fuel, its projected use of distillate oil for energy production is less than one percent. Thus, oil price volatility will have a limited impact on the Company.

e. **OTHER:**
Non-Applicable.

83. Please provide a comparison of the Utility's 2021 fuel price forecast and the actual 2021 delivered fuel prices.

A

	*2021 Fuel Price Forecast ($/MMBtu)	**2021 Actual Fuel Prices ($/MMBtu)	Delta
Jan	4.24	3.48	-0.76
Feb	4.09	3.76	-0.33
Mar	4.05	3.65	-0.40
Apr	3.78	3.40	-0.38
May	3.74	3.90	0.16
Jun	3.76	4.13	0.37
Jul	3.79	4.42	0.63
Aug	3.79	4.77	0.98
Sep	3.78	5.15	1.37
Oct	3.78	6.73	2.95
Nov	3.89	7.05	3.16
Dec	4.03	5.86	1.83
Average	3.89	4.69	0.80

*Jan-Dec forecast prices from filing on 9/3/20
*Jan-Jun actual prices from filing on 7/27/21 and Jul-Dec actual prices from filing on 1/25/22

84. Please explain any notable changes in the Utility's forecast of fuel prices used to prepare the Utility's 2022 TYSP compared to the fuel process used to prepare the Utility's 2021 TYSP.

A. There were no notable process changes in the Utility's forecast of fuel prices from the 2021 TYSP to the 2022 TYSP.

85. Please identify and discuss steps that the Company has taken to ensure natural gas supply availability and transportation over the current planning period.

A. Tampa Electric continually evaluates its natural gas portfolio to ensure it has adequate natural gas assets in place to deliver reliable, low-cost gas from the supply area directly to our generating facilities. In fall 2022, a lateral that allows natural gas to be delivered to the Big Bend Station from FGT will be completed. Upon the completion of that lateral, the Big Bend Station will have simultaneous access to both FGT and Gulfstream pipelines, similar to the Bayside Station. The lateral will increase the reliability of gas transportation to the Big Bend Station in the event of a pipeline interruption. Also, in fall 2022, Tampa Electric will replace its Sabal Trail gas transportation capacity with Gulfstream capacity to supply the Big Bend Modernization project and to meet the growing gas requirements of the portfolio as the Company continues its transition away from coal to natural gas and renewables.

Other areas of focus include evaluating opportunities for 1) enhancing the portfolio of fuel assets to mitigate supply or transport interruptions as well as meeting extreme peak demand requirements, 2) improving pipeline transportation commercial terms upon renewal, 3) evaluating the quality of pipeline receipt points and requesting changes as production evolves, 4) targeting seasonal firm supply during the Company's annual natural gas supply RFP that is less susceptible to interruptions from extreme conditions and, 5) additional market area or upstream pipeline capacity or storage to meet growing gas requirements.

TAMPA ELECTRIC COMPANY
UNDOCKETED: REVIEW OF TYSP'S
SUPPLEMENTAL DATA REQUEST
REQUEST NO. 86
BATES PAGE: 108
FILED: MAY 6, 2022

86. Please identify and discuss any existing or planned natural gas pipeline expansion project(s), including new pipelines and those occurring or planned to occur outside of Florida that would affect the Company during the current planning period.

A. Numerous natural gas pipeline projects have been completed, are in the works, or are proposed to move natural gas from the Mid-continent, Appalachia, and Permian production areas, to markets across the United States. These are the primary projects that directly impact the Florida market and the Company:

- Alabama - Gulfstream Natural Gas Pipeline System Phase VI expansion (2022)
- Alabama - Transco's Hillabee Expansion Phase III project; part of the Southeast Market Pipelines project (2024)
- Louisiana - Multiple gulf coast pipeline projects (Gulf Run) feeding LNG exports and other Gulf Coast markets (various phases)
- Texas - Multiple pipeline projects (Gemini Phase 2) from the Permian and other shale basins to Carthage or the Gulf Coast (various phases)

87. Please identify and discuss expected liquefied natural gas (LNG) industry factors and trends that will impact the Company, including the potential impact on the price and availability of natural gas, during the current planning period.

A. There are currently six operational LNG projects in the U.S. exporting significant amounts of LNG to world markets, specifically Europe and Asia. A seventh facility is ramping up production now with three more under construction as well as expansions planned at several existing facilities. The projects that have been approved and constructed have had little impact on Tampa Electric's natural gas supply portfolio but have impacted the short-term price of natural gas including increased volatility. Global demand for LNG was strong heading into the winter and LNG exports facilities continue to operate at full utilization. LNG feed gas demand is expected to increase steadily through the current planning period and could accelerate new LNG projects depending on increased European LNG demand following Russia's invasion of the Ukraine. Aside from the uncertainty of current Ukraine events which could be significant, LNG exports should continue to impact natural gas prices including more short-term volatility more than the availability of natural gas supply for the Company.

88. Please identify and discuss the Company's plans for the use of firm natural gas storage during the current planning period.

A. Tampa Electric currently maintains 2,000,000 MMBtu of underground natural gas storage capacity at two facilities. This high-deliverable salt dome storage is a key component of the Company's natural gas portfolio. The storage serves both as a reliable supply source of natural gas during supply interruptions and a key component of balancing supply and demand on a daily basis. Tampa Electric attempts to keep its storage levels around 80% of contracted capacity but increases inventories close to full in advance of winter and summer seasons. Maintaining this volume allows the storage to be a reliable source of supply that provides risk mitigation against various events, such as production freeze-offs during the winter and summertime production shut-ins due to storms (e.g., hurricanes) in the Gulf of Mexico that impact Mobile Bay, Destin, and other offshore facilities. The Company utilized significant storage inventory during Storm Uri to prevent fuel interruptions at Tampa Electric's generating facilities. The amount of required storage capacity in the portfolio is continuously evaluated based on market conditions and weather events.

89. Please identify and discuss expected coal transportation industry trends and factors, for transportation by both rail and water that will impact the Company during the current planning period. Please include a discussion of actions taken by the Company to promote competition among coal transportation modes, as well as expected changes to terminals and port facilities that could affect coal transportation.

A. Tampa Electric enjoys the benefit of having access to rail and water vessel transportation, which provides optionality and resilience to the solid fuel supply chain. The benefit of bi-modal coal transportation has never been as important as it is now. Although the coal industry has experienced significant challenges over the past few years as decarbonization has greatly reduced the demand for coal, the domestic demand for coal increased quickly in the fall of 2021 when the solid fuel became economic as natural gas prices soared on winter inventory concerns. The increased demand was greater than supply and spot coal prices reached the highest levels in years. The increased demand for coal combined with supply chain and labor challenges in the post COVID-19 economic recovery caused significant congestion on the rail system and coal deliveries by rail were limited or interrupted. The Company has always strived to maintain bi-modal transportation agreements to encourage market liquidity and increased reliability of supply should one source experience interruption. Due to the recent struggles of rail transportation, the Company is currently focused on waterborne coal deliveries until rail transportation becomes more reliable.

Although coal consumption is declining at Tampa Electric, there is great uncertainty with coal transportation early in the planning period as demand for coal has changed in the short term and the invasion of the Ukraine only exacerbates the uncertainty. The Company will continue to focus on bi-modal agreements for reliable, economic coal deliveries to our plants.

TAMPA ELECTRIC COMPANY
UNDOCKETED: REVIEW OF TYSP'S
SUPPLEMENTAL DATA REQUEST
REQUEST NO. 90
BATES PAGE: 112
FILED: MAY 6, 2022

90. Please identify and discuss any expected changes in coal handling, blending, unloading, and storage at coal generating units during the current planning period. Please discuss any planned construction projects that may be related to these changes.

A. There are no expected changes in coal handling, blending, unloading or storage facilities for the period 2022 through 2031.

TAMPA ELECTRIC COMPANY
UNDOCKETED: REVIEW OF TYSP'S
SUPPLEMENTAL DATA REQUEST
REQUEST NO. 91
BATES PAGE: 113
FILED: MAY 6, 2022

91. Please identify and discuss the Company's plans for the storage and disposal of spent nuclear fuel during the current planning period. As part of this discussion, please include the Company's expectation regarding short-term and long-term storage, dry cask storage, litigation involving spent nuclear fuel, and any relevant legislation.

A. Non-Applicable.

92. Please identify and discuss expected uranium production industry trends and factors that will affect the Company during the current planning period.

A. Non-Applicable.

Extreme Weather

93. Please identify and discuss steps that the Company has taken to ensure continued energy generation in case of a severe cold weather event.

A. Tampa Electric takes several steps to ensure continued energy generation in case of a severe cold weather event. First, Tampa Electric maintains and regularly updates Freeze Protection plans for all three (3) generation facilities: Bayside, Big Bend, and Polk Power Station. The freeze protection plans provide guidance for preparing for, and operating reliably during, a severe cold weather event. Additionally, Tampa Electric regularly reviews the resiliency of Tampa Electric's generating units and transmission and distribution network to a major and unusual extreme cold weather event. The most recent review was particularly detailed considering the events in ERCOT in February 2021. This review identified opportunities for improving equipment's resistance to extreme cold weather. Those equipment improvements are targeted to be complete before the winter of 2022/23. Finally, Tampa Electric assures that fuel supply, fuel inventory and fuel transportation assets are prepared to meet customer's energy generation needs during a severe cold weather event. Tampa Electric enhances fuel resiliency by diversifying fuel receipt points, having access to, and delivery of, fuel via multiple pipelines or modes, and having backup fuel or dual fuel capability at multiple generation stations.

94. Please identify any future winterization plans the Company intends to implement over the current planning period.

A. Throughout the current planning period, Tampa Electric will continue to regularly review the resiliency of its generation fleet, distribution network, fuel supply portfolio, training, planning and operations to enhance the winterization of its system to ensure reliable energy delivery to customers during a severe winter cold, hurricane, or other disruptive event.

95. Please explain the Company's planning process for flood mitigation for current and proposed power plant sites and transmission/distribution substations.

A. SUBSTATIONS:

All new substations that are built require permitting through the appropriate governmental agencies. This ensures that all state and local storm water requirements are met. Depending on the flood zone where a new substation is built, the elevation of the substation may be built above normal grade. Foundations and control houses may be elevated to mitigate water intrusion on lower elevation parcels. For existing substations, Tampa Electric keeps current elevation above sea level and evacuation zone category data. For a few substations where past flooding has been an issue during a major storm event, mitigating efforts have been made such as building a wall around critical equipment, cameras to watch water levels in the stations, and installing sandbags around control house entry doors.

POWER PLANTS:

Tampa Electric uses a combination of strategies to mitigate the impact of flooding on new power plants. These strategies are primarily use of flood walls to prevent flood waters from reaching critical equipment, raising site elevation, and elevating critical equipment which is outside the flood wall to a height not anticipated to be affected by flooding. The Big Bend Modernization Project has incorporated mitigating actions such as site elevation and a 10' flood wall to protect the critical equipment. Each existing power plant was constructed to comply with permitting and other regulations and mitigate flood risk through elevation. Each existing power plant has a storm plan that addresses potential flooding and actions taken to reduce flooding impacts to the electric system. The storm plans include the use of storm walls or doors, flood pumps, and sandbags to secure the plant, and other actions as appropriate for that plant. Polk Power Station and most solar generation sites are located inland and are not prone to flooding. They are designed for proper water management and a 100-year rain event.